

REMARKS

Claims 28-37, 39-47, 49 and 50 were pending when the present Office Action was mailed on May 13, 2009, with claim 37 being withdrawn from consideration. In this response, claims 30, 33 and 39 have been amended to clarify certain features of these claims and to expedite prosecution of this application; the foregoing amendments are made without prejudice to pursuing these claims in unamended or other forms in a continuation or other application. No claims have been added or canceled in this response. Accordingly, claims 28-36, 39-47, 49 and 50 are currently under consideration.

In the May 13, 2009 Office Action, claims 28-36, 39-47, 49 and 50 were rejected. More specifically, the status of the application in light of this Office Action is as follows:

(A) The drawings were objected to under 37 C.F.R. § 1.83(a) for allegedly failing to show every feature of the invention specified in the claims;

(B) Claims 28, 33, 39-41, 43 and 44 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,459,150 to Wu et al. ("Wu");

(C) Claims 31, 34 and 46 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Wu and U.S. Patent Application Publication No. 2004/0023447 to Hirakata et al. ("Hirakata");

(D) Claims 32, 35 and 47 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Wu and U.S. Patent Application Publication No. 2004/0087441 to Bock et al. ("Bock");

(E) Claims 29, 30, 36, 45 and 49-52 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Wu and U.S. Patent No. 6,809,421 to Hayasaka et al. ("Hayasaka");

(F) Claim 42 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Wu and U.S. Patent No. 6,982,487 to Kim et al. ("Kim"); and

(G) Claim 30 was rejected on the grounds of statutory type double patenting.

A. Response to the Objection to the Drawings

The drawings were objected to under 37 C.F.R. § 1.83(a) for allegedly failing to show certain features of original claims 39 and 44 related to the "second microelectronic device." Although the applicant does not concede that illustration of such features is necessary to understand the subject matter sought to be patented (37 C.F.R. § 1.81), the specification has been amended and Figure 9 added to reflect subject matter of the originally-filed claims. (MPEP § 608.01(I)). Accordingly, the objection to the drawings should be withdrawn.

B. Response to the Section 102(b) Rejection of Claims 28, 33, 39-41, 43 and 44 (Wu)

Claims 28, 33, 39-41, 43 and 44 were rejected under 35 U.S.C. § 102(b) as being anticipated by Wu. For at least the following reasons, Wu does not support a Section 102 rejection of these claims. Accordingly, the Section 102 rejection of these claims should be withdrawn.

Independent claim 28 is directed to a packaged microelectronic device that includes, *inter alia*, a die having a bond-pad electrically coupled to an integrated circuit. The packaged microelectronic device further includes a passage extending completely through the die and the bond-pad. A first conductive material is deposited in a first portion of the passage to form a conductive plug electrically connected to the bond-pad, and a second conductive material is deposited in a second portion of the passage in contact with the conductive plug to at least generally fill the passage.

Independent claim 44 is directed to a microelectronic device set that includes first and second microelectronic devices. The first microelectronic device includes features at least generally similar to those of the packaged microelectronic device of claim 28. For example, the first microelectronic device includes, *inter alia*, a first die having a first bond-pad electrically coupled to a first integrated circuit. The first microelectronic device further includes a conductive interconnect deposited in a passage extending through the first bond-pad. The conductive interconnect includes a first conductive material deposited in a first portion of the

passage to form a conductive plug in contact with the bond-pad, and a second conductive material deposited in a second portion of the passage in contact with the conductive plug to at least generally fill the passage.

Wu discloses a solder bump 90 connecting a conductive pad 82 on an electronic substrate 80 to a conductive pad 58 on a silicon wafer 50. (Wu, Figures 2E-2G, and column 8 at lines 39-51). The electronic substrate 80 is, "i.e. a printed circuit board." (Wu in column 8 at lines 47-48). As Wu explains, after the silicon wafer 50 and the electronic substrate 80 have been suitably clamped together, liquid solder material may be flowed through the aperture 70 to fill a gap between the silicon wafer 50 and the substrate 80 to form a solder bump 90. (Wu, Figure 2F, in column 8 at lines 47-51). The solder bump 90 shown in Figure 2F is then reflowed into the solder ball 100 and conductive plug 92 shown in Figure 2G during a solder reflow process. (Wu, column 8 at lines 57-60). As Wu expressly notes, "the plurality of metal plugs 92 are formed integrally with the solder balls 100." (Wu in column 8 at lines 60-64).

Wu cannot support Section 102 rejections of independent claims 28 and 44 for at least the reason that this reference fails to disclose or suggest each and every feature of these claims. The packaged microelectronic device of claim 28, for example, includes a first conductive material deposited in a first portion of the passage to form a conductive plug, and a second conductive material deposited in a second portion of the passage in contact with the conductive plug. Wu does not disclose or suggest these first and second conductive materials.

The Office Action suggests that the solder bump 90 shown in Figure 2F of Wu constitutes the conductive plug of claim 28, and the metal plug 92 shown in Figure 2G of Wu constitutes the second conductive material of claim 28. This construction ignores the express teaching of Wu. More specifically, Wu expressly teaches that the metal plug 92 *is not* formed from a second conductive material that contacts the solder bump 90, but to the contrary, *the metal plug 92 is integrally formed from the solder bump 90*. Therefore, the metal plug 92 of Wu cannot constitute "a second conductive material" that is "in contact with" the solder bump 90 because the metal plug 92 and the solder bump 90 are the same portion of material.

Accordingly, Wu cannot support Section 102 rejections of independent claims 28 and 44 for at least this reason, and the rejections should be withdrawn.

Wu also cannot support a Section 102 rejection of independent claims 33 and 39. Claim 33, for example, expressly states that the first conductive material which forms the conductive plug *is different* than the second conductive material deposited in the passage in contact with the conductive plug. In contrast, Wu expressly teaches that the metal plug 92 is integrally formed from the solder bump 90 during a reflow process and, therefore, is formed from the *same material* as the solder bump 90 – not a different material. (Wu in column 8 at lines 59-62: "*The solder bumps 90 are reflowed into solder balls 100...in the same reflow process, the solder material...forms a plurality of conductive plugs 92.*") Thus, Wu could not support a Section 102 rejection of independent claim 33 for at least this reason, and the rejection should be withdrawn.

Independent claim 39 is directed to a microelectronic device set that includes a first microelectronic device. The first microelectronic device has a conductive interconnect formed from a first conductive material deposited in a first portion of a passage to form a conductive plug, and a second conductive material deposited in a second portion of the passage in contact with the conductive plug. Claim 39 has been amended to clarify that the first conductive material forms *a boundary in the passage*, and the second conductive material *contacts the boundary*. An embodiment of this boundary is shown in, for example, Figure 5B of the present application. In contrast, Wu fails to disclose or suggest a boundary between first and second conductive materials because Wu only discloses a single portion of a single conductive material, not first and second conductive materials. Therefore, Wu cannot support a Section 102 rejection of independent claim 39 for at least this reason, and the rejection should be withdrawn.

Claims 40, 41 and 43 depend from base claim 39. Accordingly, Wu cannot support Section 102 rejections of dependent claims 40, 41 and 43 for at least the reason that Wu could not support a Section 102 rejection of corresponding base claim 39, and for the additional features of these dependent claims. Therefore, the rejection of dependent claims 40, 41 and 43 should be withdrawn.

The rejections of claims 33, 39-41, 43 and 44 should be withdrawn for at least one additional reason. Each of these claims is directed to a microelectronic device *set* that includes, *inter alia*, a *first die* with a first bond-pad electrically coupled to a first integrated circuit, and at least a *second die* with a second bond-pad electrically coupled to a second integrated circuit. The Office Action suggests that the printed circuit board 80 of Wu can be construed as "a first die (80)." (Office Action at page 5). The applicant respectfully disagrees. In column 8 at lines 46-48, Wu expressly identifies the electronic substrate 80 as, "i.e. a printed circuit board" formed "of an insulating material 88." For the purposes of a Section 102 rejection, a "printed circuit board" cannot reasonably be construed as a die having an integrated circuit electrically coupled to a bond-pad. Therefore, Wu fails to disclose or suggest each and every feature of claims 39-41, 43 and 44 for at least this additional reason, and the rejection of these claims should be withdrawn.

C. Response to the Section 103(a) Rejection of Claims 31, 34 and 46 (Wu and Hirakata)

Claims 31, 34 and 46 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Wu and Hirakata. For at least the following reasons, Wu and Hirakata, whether considered individually or in combination, fail to disclose or suggest all of the features of these claims. Accordingly, the Section 103 rejection of claims 31, 34 and 46 should be withdrawn.

Claim 31 depends from base claim 28, claim 35 depends from base claim 33 and claim 47 depends from base claim 44. Wu cannot support a Section 102 rejection of base claims 28, 33 and 44 for at least the reasons discussed in detail above. Moreover, Hirakata fails to cure the deficiencies of Wu with respect to base claims 28, 33 and 44. Accordingly, the proposed combination of Wu and Hirakata cannot support a Section 103 rejection of dependent claims 31, 34 and 46 for at least the reason that these references cannot support a Section 103 rejection of corresponding base claims 28, 33 and 44. Therefore, the Section 103 rejection of dependent claims 31, 34 and 46 should be withdrawn.

D. Response to the Section 103(a) Rejection of Claims 32, 35 and 47 (Wu and Bock)

Claims 32, 35 and 47 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Wu and Bock. For at least the following reasons, Wu and Bock, whether considered individually or in combination, fail to disclose or suggest all of the features of these claims. Accordingly, the Section 103 rejection of claims 32, 35 and 47 should be withdrawn.

Claim 32 depends from base claim 28, claim 35 depends from base claim 33, and claim 47 depends from base claim 44. Wu cannot support a Section 102 rejection of base claims 28, 33 and 44 for at least the reasons discussed in detail above. Moreover, Bock fails to cure the deficiencies of Wu with respect to base claims 28, 33 and 44. Accordingly, the proposed combination of Wu and Bock cannot support a Section 103 rejection of dependent claims 32, 35 and 47 for at least the reason that these references cannot support a Section 103 rejection of corresponding base claims 28, 33 and 44, and for the additional features of these dependent claims. Therefore, the Section 103 rejection of dependent claims 32, 35 and 47 should be withdrawn.

E. Response to the Section 103(a) Rejection of Claims 29, 30, 36, 45 and 49-52 (Wu and Hayasaka)

Claims 29, 30, 36, 45 and 49-52 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Wu and Hayasaka. For at least the following reasons, Wu and Hayasaka, whether considered individually or in combination, fail to disclose or suggest all of the features of these claims. Accordingly, the Section 103 rejection of claims 29, 30, 36, 45 and 49-52 should be withdrawn.

Claims 29 and 49 depend from base claim 28, claims 36 and 50 depend from base claim 33, claims 30 and 51 depend from base claim 39, and claims 45 and 52 depend from base claim 44. Wu cannot support a Section 102 rejection of base claims 28, 33, 39 and 44 for at least the reasons discussed in detail above. Moreover, Hayasaka fails to cure the deficiencies of Wu with respect to base claims 28, 33, 39 and 44. Therefore, the proposed combination of Wu and Hayasaka cannot support a Section 103 rejection of dependent claims 29, 30, 36, 45 and 49-52 for at least the reason that these references cannot support a Section 103 rejection of

corresponding base claims 28, 33, 39 and 44, and for the additional features of these dependent claims. Therefore, the Section 103 rejection of dependent claims 29, 30, 36, 45 and 49-52 should be withdrawn.

F. Response to the Section 103(a) Rejection of Claim 42 (Wu and Kim)

Claim 42 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Wu and Kim. For at least the following reasons, Wu and Kim, whether considered individually or in combination, fail to disclose or suggest all of the features of this claim. Accordingly, the Section 103 rejection of claim 42 should be withdrawn.

Claim 42 depends from base claim 39. Wu cannot support a Section 102 rejection of base claim 39 for at least the reasons discussed in detail above. Moreover, Kim fails to cure the deficiencies of Wu with respect to base claim 39. Accordingly, the proposed combination of Wu and Kim cannot support a Section 103 rejection of dependent claim 42 for at least the reason that these references cannot support a Section 103 rejection of corresponding base claim 39, and for the additional features of this dependent claim. Therefore, the Section 103 rejection of dependent claim 42 should be withdrawn.

G. Response to the Double Patenting Rejection of Claim 30

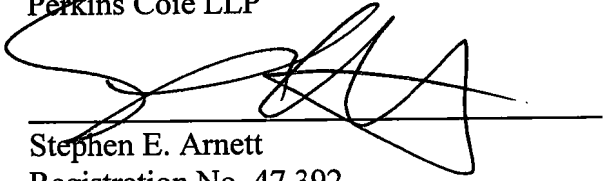
Claim 30 has been amended to depend from base claim 39. Accordingly, the double patenting rejection of claim 30 should be withdrawn.

H. Conclusion

In view of the foregoing, the pending claims comply with 35 U.S.C. § 112 and are patentable over the applied art. The Applicants accordingly request reconsideration of the application and a Notice of Allowance. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to contact Stephen Arnett at (206) 359-6351.

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